DOCUMENT RESUME

ED 021 291 24 CG 002 689

ANTHROPOMETRIC TRAINING PROJECT. FINAL REPORT.

San Diego State Coll., Calif.
Spons Agency- Office of Education (DHEW), Washington, D.C. Bureau of Research
Bureau No- BR-6-2103
Pub Date 30 Sep 67
Grant- OEG-4-6-062103-1352
Note- 12p.
EDRS Price MF-$0.25 HC-$0.56
Descriptors- *ANTHROPOLOGY, INSTITUTES (TRAINING PROGRAMS), *PHYSICAL EDUCATION, RESEARCH, *RESEARCH SKILLS

The Anthropometric Training Project was aimed at providing a training program for select students to develop research competency in an area relating body type, composition, anthropometric assessment, and physical performance measures. The program involves interdisciplinary cooperation in training through seminars, laboratory practice, and independent small-group projects. Major content areas and approximate sequence of instructions included: (1) anthropometric research methodology, (2) resolution of data, (3) physique and body type, (4) body composition, (5) anthropometric procedures and practice, and (6) selected performance parameters. A thorough evaluation of the program is included. The conclusion was that the program did develop research competency in an area relating physical performance to anthropometry. (Author/PH)

BR-6-2103
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ANTHROPOMETRIC TRAINING PROJECT

September 30, 1967

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U. S. Department of
Health, Education, and Welfare

Office of Education
Bureau of Research

ANTHROPOMETRIC TRAINING PROJECT

GRANT NO: OEG 4-6-062103-1352

Program Director: Dr. J. E. L. Carter

September 1966 through June 1967

The training program reported herein was conducted pursuant to a grant from the Office of Education, U.S. Department of Health, Education, and Welfare. Grantees undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment of the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

San Diego State College
San Diego, California

ORIENTATION OF PROGRAM

The Anthropometric Training Project conducted in the Physical Education Department of San Diego State College was a special project in the Educational Research Training Program, Higher Education Act of 1965, Title IV, administered by the Department of Health, Education, and Welfare, Office of Education, Washington.

This special project aimed at providing a training program for select students to develop research competency in an area relating body type, composition, anthropometric assessment, and physical performance measures. The program involved interdisciplinary cooperation in furnishing training through seminars, laboratory practice, and independent and small-group projects. In the past, these experiences had received only cursory attention in regular course offerings in different departments. The training program was designed to go beyond diverse course experiences and permit synthesis and depth not otherwise available.

The project extended from September 1966 to June 1967. Six students were selected as stipend holders and funded from the project funds. An additional eight graduate students, four of whom were women, participated in the project. All were graduate students of high caliber except for three, who were outstanding seniors.

DESCRIPTION OF THE PROGRAM

The project was conducted during the fall semester of 1966 and the spring semester 1967. An outline of the major content areas and the approximate sequence of instruction was as follows:

1. Anthropometric Research Methodology: Introduction to laboratories and equipment, structure of scientific thought, location of pertinent literature.

2. Resolution of Data: Review of computational formulae and procedures, summary of probability theory, elegance in design and analysis.

3. Physique and Body Type: Traditional anthropometry, Sheldon's system, Parnell's M.4 Deviation Chart Method, Heath-Carter modification, photographic technique, somatotype photography.

4. Body Composition: Historical overview, hydrostatic technique, anthropometric technique, radioactivity and its detection, counter instrumentation and error, K40 technique of estimating lean body mass.

5. Anthropometric Procedures and Practice: Anthropometric landmarks and conventions; selection of techniques; skinfolds; diameters; girths; weight, stature and normative data; skeletal age assessment.

6. Selected Performance Parameters: Electro-chemical phenomena in muscle contraction, electromyographic instrumentation, electromyographic technique, strength assessment, submaximal physiological tests.

The above topics and their associated laboratory experiences were essentially as indicated in the original proposal. Only slight alterations were made to accommodate some of the consulting lecturers and to fit their travel schedules. One major departure from the original proposal was the deployment of the Assistant Director's time. Dr. William D. Ross left San Diego during the summer of 1966 for Simon Fraser University in Canada, but was available and did return for his contribution to the project in a Research Leave semester from his university. His departure, however, necessitated a re-arrangement of personnel for topics which he would have covered in the first semester. Faculty members in the department of physics, mathematics, anthropology, education, and physical education were hired to deal with selected topics early in the program. The project Director, Dr. Carter, had to conduct all of the early laboratory experiences, and this probably resulted in poorer individual instruction than if both the Director and Assistant Director had been available. From February through April of 1967, Dr. Ross devoted a considerable portion of his Research Leave time to the project and all his special areas of interest were well covered in this time.

EVALUATION OF THE PROGRAM

I. Program Factors

A. Objectives
The major objective of the program, to develop a research competency in an area relating physical performance to anthropometry, was clearly met.

B. Content
A noteworthy aspect of the laboratory practices arranged for the group was the participation in on-going projects run by faculty at San Diego State. These included an N.I.H. sponsored study involving physiologic and anthropometric assessment of middle-aged males in training, the anthropometric assessment of underwater demolition trainees in conjunction with the United States Navy, a project of the Canadian National Fitness and Amateur Sport Foundation directed by Dr. Ross and partially conducted at San Diego

State, San Diego State College Foundation sponsored research on body composition, and participation in studies using the whole body counter facility in the Physics Department at San Diego State.

C. Staff

Apart from a need for greater faculty supervision on the individual studies by the participants, the staffing was adequate and was, certainly, expert. The consultants brought from other universities were outstanding and provided highlights for the program.

D. Trainees

Six stipend holders were chosen for participation in the program. Three were graduate students and three were outstanding senior students. Two students were majors in physics, one a major in psychology with a minor in physical education, and the remaining three, majors in physical education with minors in biology. Eight other students attended one or two semesters of the project. Four of these were women and four were men. All of these eight students were graduate students with a number of them being school teachers or completing their teaching credential pattern for school teaching. Some outstanding students in our department were unable to apply for stipends in this program since they had already applied for much more extensive stipends under teacher traineeships, also Title IV.

E. Organization

The size of the class was small enough to permit flexible use of facilities and equipment. Where there was any conflict, those with stipends had precedence over those without, although in practice all students managed to complete lab work on assignments on time. A considerable amount of substantive material was covered in the course, and this appeared to leave little time for the students to work on their projects. Consequently, some projects ran passed their allotted deadlines, but were completed eventually. A greater amount of time could have been allowed for reports to the class on individual projects. Prior to the project it was expected that our electromyographic laboratory would be functioning during the spring semester. This was not the case so the EMG practicum was not conducted. The project Director received excellent support and cooperation from the Department of Physical Education, the Director of the Division of Health, Physical Education, and Recreation, Dr. William Terry, and the San Diego State College Foundation. No on-site visit was made by the Office of Education, but one would have been welcomed.

F. Budget
Although the total amount in the budget was not quite as high as that requested, the program was run adequately, largely because San Diego State paid the salary of the program Director through credit as a graduate seminar.

II. There can be no doubt that the highlights of the program were the presentations on recent advances in their areas by the consultants. These instructors and their areas were as follows:

A. Body composition relationships, Dr. Albert Behnke, M.D., University of California, and National Radiation Defense Laboratory.
B. Electromyography, Dr. Herbert DeVries, University of Southern California.
C. The Heath Somatotype Method, Dr. Barbara H. Heath, Fellow of the American Anthropological Association.
D. Potassium 40 and Whole Body Counting, Dr. Lester Skolil, Physics Department, San Diego State.

The students had laboratory experience in all of these techniques except electromyography, which was lecture demonstration series of seminars only.

III: In addition to class participation, laboratory experience, and project participation, the students worked on individual projects. The titles of these projects are listed in Appendix A. The training project attempted to bring together a variety of specialized areas and relate them through a common denominator of physical performance. The students in the class were from diverse backgrounds and this aided rather than hindered the course work. They worked together very well and provided their expertise in helping bridge gaps between the areas. In general, the studies were concerned with reliability of technique, application of the techniques to a problem, and interpretation of the results. Although not all studies were excellent in their final form, many of them are suitable for publication, and we hope the students prepare them for this. Two of the students used techniques from the project in their Master's Thesis, while eight more are planning studies related to this area. Some of the students have been using the measurement techniques in their jobs as teachers in the local high schools. One student obtained a summer job at the National Radiation Defense Laboratory through Dr. Behnke.

It was the strong concensus of the instructors in the project that not only did the students benefit considerably, but the institution, San Diego State, and indirectly, Simon Fraser University where Dr. Ross is located, profited immeasurably by the techniques and the knowledge gained from the projects.

It is anticipated that future teachers will be better trained as a result of this endeavor.

IV. Recommendations

The communications with the Office of Education were simple and straight forward and allowed ease of administration through the San Diego State College Foundation to the project Director. The few questions asked were answered promptly and aided smooth running of the project. There was sufficient flexibility in the contract to allow for versatile management of funds and personnel.

PROGRAM REPORTS

I. Publicity

A. A national newspaper release apparently made by a San Diego congressman or senator indicated that this Grant had been awarded to San Diego State and gave the essence of the project.

B. Two articles were presented in the San Diego State College newspaper describing aspects of the program and some of the student projects.

C. The planned publications will carry acknowledgement as to support from the Office of Education.

D. The announcement to applicants for the project is attached as Appendix B. This was mailed to several universities, including the University of Iowa, Colorado State College, University of Oregon. Some inquiries were received from individuals there, but not followed through by students.

II. Application Summary

A. Approximate number of inquries from prospective trainees (letter or conversation)	15
B. Number of completed applications received	6
C. Number of first rank applications (applicants who are well-qualified whether or not they were offered admission)	6
D. How many applicants were offered admission	6

III. Trainee Summary

A. Number of trainees initially accepted in program	6
Number of trainees enrolled at the beginning of program	6

B. Categorization of trainees

(1) Number of trainees who principally are elementary or secondary public school teachers	3
(2) Number of trainees who are principally local public school administrators or supervisors	0
(3) Number of trainees from State education groups	0
(4) Number of trainees from colleges or universities, junior colleges, research bureaus, etc. (specify) Graduate students	3

IV. Program Director's Attendance

A. What was the number of instructional days for the program?	82
B. What was the percent of days the director was present?	100%

V. Financial Summary--(Note: This summary does not serve as a final financial report so amounts need not be exact.)

	Budgeted	Expended or Committed
A. Trainee Support		
(1) Stipends	$4500	$4500
(2) Dependency allowance	----	----
(3) Travel	----	----
B. Direct Costs		
(1) Personnel	600	600
(2) Supplies	----	----
(3) Equipment	1925	1915
(4) Travel	----	----
(5) Other (Institution Allowance)	4500	4500
C. Indirect Costs	922	922
TOTAL	$12,447	$12,437

APPENDIX A

ANTHROPOMETRIC TRAINING PROJECT

GRANT NO: OEG 4-6-062103-1352

STUDENT PROJECTS AND STUDIES

(S) = Stipend holder

D. DAVIS (S)

"Comparisons of anthropometric Measurements on right and left side."
"Observer reliability on Behnke's anthropometric technique."
"Anthropometric changes in exercising adult men."

R. KURASHIGE (S)

"Calibration of grip dynamometer."
"Determination of lean body mass by whole body counting."
"Reliability of lean body mass by whole body counting."

G. MARTIN (S)

"Calibration of the exotronic system."
"Body Composition as a factor of muscular strength."
"The exotronic system as a calibrator."

J. RUZICH (S)

"Calibration of three tensiometers."
"Determination of lean body mass by whole body counting, I."
"Determination of lean body mass by whole body counting,II."

D. SLEET (S)

"A work sheet for the one way analysis of variance."
"The development of an instrument for assessing self-concept changes as they are influenced by exercise."
"Skeletal age and its relation to physiological and psychological factors in asthmatic children."

A. ZASUETA (S)

"Observer reliability of anthropometric measures used in Behnke's body weight assessment."
"Body weight assessment by anthropometry."
"Somatotypes of mentally retarded educable students."

J. CLIMIE

"Test-retest reliabilities on Parnell's M.4 somatotype technique."
"Comparison of Parnell's M.4 and the Heath-Carter somatotype techniques."

R. FISHER

"Relationship between sit-ups and several anthropometric measurements."
"The relationship of skinfolds and several anthropometric measurements."

M. GOLDEN

"Physiques of college and high school cross country runners."

J. GUTOWSKI

"Review of the anthropometric differences between Negro and White athletes."

C. McLURE

"Inter-observer reliabilities on Parnell's M.4 deviation chart technique."
"The relationship of strength index measures, height and weight to vertical jumping ability in college women volleyball players."

G. SUTORIUS

"Somatotypes of college rowers."

C. BRADY

"A comparison of two methods for determining leg length for high school girls aged 15 to 19."

APPENDIX B

FELLOWSHIPS IN PHYSICAL EDUCATION
SAN DIEGO STATE COLLEGE

ANTHROPOMETRIC RESEARCH TRAINING PROJECT

(In the Educational Research Training Program, Higher Education Act of 1965, Title IV).

I. Description of the Program

This special project is a one year research training program for select men or women students aimed at developing research competency in an area relating body type, composition, anthropometric assessment and physical performance measures. This project involves interdisciplinary cooperation in furnishing training through seminars, laboratory practice, and independent and small-group projects.

II. Faculty

The majority of the program will be under the direction of Drs. J.E.L. Carter and W.D. Ross, San Diego State. Special lecturers include Dr. L. Skolil (Physics) body composition, K-40 technique; Dr. A. Romano (Mathematics) experimental design; Dr. A. Behnke (M.D. University of California) body composition; Mrs. Barbara Heath, somatotype consultant; Dr. H. DeVries (Physiology, U.S.C.) electromyography.

III. Stipend

Three fellowships, carrying a stipend of $1,000 plus $400 for each dependent, will be available for graduate students.

Three fellowships, carrying a stipend of $500 will be available for outstanding seniors.

IV. Credit

Recipients of fellowships will enroll for six semester hours credit in both Fall and Spring semesters of the 1966-67 academic year.

Non-fellowship students may enroll and participate in the program for credit with the permission of the program director.

V. Eligibility

1. Graduate student or outstanding senior.
2. Demonstrated ability in related course work (statistics; measurement and evaluation; kinesiology; physiology of exercise; or other courses involving measurement or experimental techniques.)

3. Recommendation from faculty members.

VI. Application

1. Applicants should petition by letter including such information as age, marital status, number of children, and a summary of educational and professional background. State grade point average in major, minor, and over-all. If previous work was not done at San Diego State, give two names of people competent to give an estimation of applicant's research potential.
2. All applications, inquiries, and correspondence should be made to: Dr. J.E.L. Carter, Department of Physical Education, San Diego State, San Diego, California 92115.
3. Application should be filed by June 30, 1966. Notification of fellowships will be made on or before July 30, 1966.